

CLAIMS

We Claim:

- 1 1. A nonlinear crystal used for mixing of optical signals, the
2 nonlinear crystal comprising:
3 a plurality of domains, the domains being arranged serially across
4 the nonlinear crystal, the domains having alternating polarity; and,
5 wherein the poling periods of the domains are varied across the
6 nonlinear crystal so as to provide nonuniform chirping of phase matching of
7 focused optical signals propagated through the nonlinear crystal.
- 1 2. A nonlinear crystal as in claim 1 wherein the nonlinear crystal is
2 composed of periodically poled lithium niobate (PPLN).
- 1 3. A nonlinear crystal as in claim 1 wherein a chirp slope is steeper
2 near a center of the non-linear crystal and shallower towards end facets of
3 the non-linear crystal.
- 1 4. A nonlinear crystal as in claim 1, wherein the poling periods of the
2 domains are varied across the nonlinear crystal so as to provide nonlinear
3 chirping of phase matching of the focused optical signals propagated
4 through the nonlinear crystal.
- 1 5. A nonlinear crystal as in claim 1, wherein the poling periods of the
2 domains are varied across the nonlinear crystal so as to provide piecewise

3 linear chirping of phase matching of the focused optical signals propagated
4 through the nonlinear crystal.

1 6. A nonlinear crystal as in claim 1 wherein the focused optical
2 signals comprise:
3 a first focused optical signal; and,
4 a second focused optical signal, the second focused optical signal
5 being an optical strobe signal.

1 7. A nonlinear crystal as in claim 1 wherein nonlinear crystal is
2 within an optical sampling digital oscilloscope.

1 8. A method for increasing spectral acceptance within a nonlinear
2 crystal, the method comprising the following steps:

3 (a) arranging the nonlinear crystal as a plurality of domains, the
4 plurality of domains having alternating polarity as the domains are
5 traversed serially across the nonlinear crystal; and,
6 (b) varying the poling periods of the domains across the nonlinear
7 crystal so as to provide nonuniform chirping of phase matching of focused
8 optical signals propagated through the nonlinear crystal.

1 9. A method as in claim 8 wherein in step (a) the nonlinear crystal is
2 composed of periodically poled lithium niobate (PPLN).

1 10. A method as in claim 8 wherein in step (b) a chirp slope is steeper
2 near a center of the non-linear crystal and shallower towards end facets of
3 the non-linear crystal.

1 11. A method as in claim 8, wherein in step (b) the poling periods of
2 the domains are varied across the nonlinear crystal so as to provide
3 nonlinear chirping of phase matching of the focused optical signals
4 propagated through the nonlinear crystal.

1 12. A method as in claim 8, wherein in step (b) the poling periods of
2 the domains are varied across the nonlinear crystal so as to provide
3 piecewise linear chirping of phase matching of the focused optical signals
4 propagated through the nonlinear crystal.

1 13. A nonlinear crystal with increased spectral acceptance, the
2 nonlinear crystal comprising:
3 a plurality of domains, the domains being arranged serially across
4 the nonlinear crystal, the domains having alternating polarity; and,
5 wherein the poling periods of the domains are varied across the
6 nonlinear crystal so as to provide nonuniform chirping of phase matching of
7 focused optical signals propagated through the nonlinear crystal.

1 14. A nonlinear crystal as in claim 13, wherein the nonlinear crystal
2 is composed of periodically poled lithium niobate (PPLN).

1 15. A nonlinear crystal as in claim 13 wherein a chirp slope is steeper
2 near a center of the non-linear crystal and shallower towards end facets of
3 the non-linear crystal.

1 16. A nonlinear crystal as in claim 13, wherein the poling periods of
2 the domains are varied across the nonlinear crystal so as to provide
3 nonlinear chirping of phase matching of the focused optical signals
4 propagated through the nonlinear crystal.

1 17. A nonlinear crystal as in claim 13, wherein the poling periods of
2 the domains are varied across the nonlinear crystal so as to provide
3 piecewise linear chirping of phase matching of the focused optical signals
4 propagated through the nonlinear crystal.

1 18. A nonlinear crystal as in claim 13, wherein nonlinear crystal is
2 within an optical sampling digital oscilloscope.